

# ■ ECON 252 Financial Markets - 01 Finance and Insurance as Powerful Forces in Our Economy and Society

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## ECON 252: Financial Markets

Lecture 1 - Finance and Insurance as Powerful Forces in Our Economy and Society	<a href="#">next session &gt;&gt;</a>
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### Overview:

Professor Shiller provides a description of the course, Financial Markets, including administrative details and the topics to be discussed in each lecture. He briefly discusses the importance of studying finance and each key topic. Lecture topics will include: behavioral finance, financial technology, financial instruments, commercial banking, investment banking, financial markets and institutions, real estate, regulation, monetary policy, and democratization of finance.

### Reading assignment:

Fabozzi et al. *Foundations of Financial Markets and Institutions*, chapter 1 (pp. 1-11) and 2

Robert Shiller, *Irrational Exuberance*, Prefaces and chapter 1

## Financial Markets: Lecture 1 Transcript

January 14, 2008

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**Professor Robert Shiller:** This is Economics 252, Financial Markets, and I'm Bob Shiller. Let me begin by introducing the teaching fellows for this course; and so I have them up here. We have five teaching fellows at this time and they're from all over. I like to put their pictures up so you'll know who they are. The teaching fellows are very international and that reflects my intention to make this a course that is also very international because finance is something about the whole world today, not just the United States. So we cover the world very well with our T.A.'s.

Usman Ali is from Pakistan, Lahore, and he graduated from the LUMS, Lahore University of Management Sciences. He's a PhD candidate now in Economics and he's doing his doctoral dissertation on stock analysts' recommendations and the relation to returns in the stock market. He's also interested in behavioral finance, which is the application of psychology to finance. The second teaching assistant--I see him right there, if you could raise your hand--Santosh Anagol, who is a representative of the United States, although he seems to have connections to India as well. He actually has a publication already in the American Economic Review on the Return to Capital with Ghana. He did this jointly with the Chairman of the Economics Department here, Chris Udry and he has spent time in India looking at the village economies. You were going to be giving away cows, did you do that?

**Student:** No, I'm still working on cows but we're not giving them away.

**Professor Robert Shiller:** Okay, that's the last time you'll hear about cows in this course. The idea was to give cows away to village farmers and to observe the outcome. It's a big change in some of these very poor villages to get a cow.

Christian Awuku-Budu is from Ghana, Accra, but he, again, went to college in the United States at Morehouse College. He is also a PhD candidate in Economics at Yale and he's been doing research on financial markets in developing countries.

Yaxin Duan is from China. She got her undergraduate degree from Nanjing University. No? You are from Nanjing, did I get a detail wrong? Where did you go to college? Okay, well I'm sorry about that. She is also a PhD candidate in Economics and is doing research on the behavior of options prices in a phenomenon called the "options smile," as she's smiling at me right now. She is also interested in behavioral finance, which is great to me because that's one of my interests. She is shown here standing precariously on a cliff. It makes me nervous to look at it overlooking Machu Picchu in Peru. She also loves astronomy, which is incidentally an interest of mine too, but you won't hear about it

again in this course.

Finally, Xiaolan Zhou is our fifth teaching assistant and she's also from China, Hubei Province. She graduated from Wuhan University and is a PhD candidate in Economics at Yale. She is doing research on bank mergers.

Let me say, I've been teaching this course now for over twenty years and I'm very proud of all of my alumni. Many of them are in the field of finance. In fact, I like sometimes when I give--I give a lot of public talks. When I give a talk on Wall Street or even somewhere else in the world I sometimes ask my audience, "Did you take my course?" It's not infrequent that I'll get one or even two people raising their hand that they took Economics 252 from me. But I'm also proud of my alumni in this course who are not in the world of finance. I think this course goes beyond--It's not just for people who are planning careers in finance because finance is a very important technology and it's very important to know finance to understand what happens in the real world. Just about any human endeavor involves finance. Now, you might say, "I could be a poet and what does that have to do with finance?" Well, it probably ends up having something to do with finance because as a poet you probably want to publish your poetry and you're going to be talking to publishers. Before you know it, they're going to be talking about their financial situation and how you fit into it.

I believe it's fundamental and very important. I think you will find this course as not a vocational course--not primarily a vocational course--but an intellectual course about how things really work. I see finance as the underpinning of so much that happens. It's a powerful force that goes behind the scene and I hope we can draw that out in this course. There is another course--we have two basic courses in finance for undergraduates at Yale. The other one is Economics 251, Financial Theory; this is Financial Markets, that one is Financial Theory. Last year it was taught by Rafael Romeu, because John, Geanakoplos who usually teaches the course, was on leave and so we had to find someone else. I assume that next fall John Geanakoplos will be teaching 251 again.

So what happened? Why do we have these two courses? Well it was something like eight years ago that we reached the present situation with two finance courses. John Geanakoplos and I had a meeting and we tried to divide up the subject matter of finance into two courses. We thought Financial Theory and Financial Markets would be the two. But the problem was that both John and I are interested in both theory and applications. John Geanakoplos is actually Chief Economist for a large investment called Ellington Capital in Greenwich, Connecticut, which you'll see a lot in the news. It has been very successful. He is very much interested in the real world and I am interested in financial theory, so we find it--we decided, after talking about it, that we really can't divide up the subject matter of finance into separate courses on theory and practice. If you tried to do one alone it would not work, so we decided to divide it up imperfectly and there may be some repetition between our two courses. Both of them are self-contained courses, so you could take either 251 or 252, or you could take both. I think maybe the best option is to take both if you're really interested in the subject matter. It is true though that his

course is more tuned into theoretical detail than mine. John is a mathematical economist and we both love mathematics, but maybe John is going to do more of it than I am.

This course actually will not use a heavy amount of mathematics. I try to keep it so that people who are not comfortable with a lot of math can take this course and I wanted to emphasize that this is--I've said that it's--I think this course is vocational preparation in a sense. I pride myself on the fact that people who have taken this course find it useful in their subsequent lives, but on the other hand, I think that it's really interesting. At least I find it really interesting and so I hope that you will too. Now I don't know, I may be different than other people, but I think organic chemistry is really interesting. How many of you have that feeling? Can I get a show of hands, who is interested in organic chemistry? I'm not getting a lot of hands raised. Unfortunately, I've never taken a course in it, but I've started reading it lately out of just my broad intellectual interest. That is a course that has a bad reputation, doesn't it? Because people say I've got to take that if I want to be pre-med. But, you know, to me there's a lot of detail in organic chemistry. To me, when you read the detail you're getting into something deep and important about the way everything works and so I start to find it interesting.

So I don't know how people feel about taking--maybe I'm turning you off by saying this--There's going to be a lot of detail in this course. Maybe I made a big mistake by likening it to an organic chemistry course--I don't mean to turn you off. The idea in this course is that by being a financial markets course, you have to know how the world works. We're going to be thinking about that in connection with Financial Theory, but we have to get into the details; so we are going to be learning about facts.

Let me start by talking about the textbook. So the principal textbook is Frank Fabozzi, the other authors are Modigliani, Jones and Ferri, *Foundations of Financial Markets and Institutions*. This textbook is very detailed and it may be--I've had some reaction by students--more than you wanted to know.

I actually had a great experience reading it. Actually, it was an earlier edition, when I first assigned this book in the year 2000, I took it with me on vacation. I was going to the Bahamas with my family and with Jeremy Siegel's family--we'll come back to Jeremy Siegel in a minute. I sat down by the pool with this book. Other people were reading novels and I don't know what else, but I was reading Fabozzi. I had such a great time with it, so I'm telling you my experience. Maybe it was because it was filling in gaps in my knowledge--things I've always wanted to know and was always curious about. That's partly what you have to develop when you get interested in a field: some sense of curiosity about all the details. So I read the whole book, 650 pages, maybe I kind of read fast because I knew a lot of it. It might take you a little longer to get through it, but I wanted you to have the same experience.

I've been assigning this book, now it's in another edition and--Fabozzi is working on a fourth or next edition, I forget what number. I've been assigning--I've gotten some complaints from students that this book is tough going because there's so much information in it. I used to tell people, "I'm assigning the whole book and you have to

know everything in the book." That's a little ambitious. I finally backed down because I met a man on Wall Street, a very prominent Wall Street person, and he said, "You know, my son started to take your course." I said, "What do you mean started the course?" He said, "Well, he dropped out when he saw this book and the requirements." I didn't like that. I don't want students to drop out. So what I decided is that you need to know the whole book in the sense that you need to know all of the key terms and key points. Now if you look at the structure of this book, it has sections that say Key Points and Key Terms. Anything that's mentioned there is fair game for me in an exam and that's the way I've done it. There are key points and key terms. Also, anything in my lecture is of course fair game for the exam. Let me also add that I have a reading list that has clickable things on it and also things that are on reserve in the library. Anything that's clickable is required reading. I don't expect you go to the library, however, because I think that we're moving into an age where you tend to want to be online, right? So the library books are all optional background.

Fabozzi, a faculty member here at Yale, has offered to give me--we have at least one chapter from the new edition that hasn't come out yet. I'm going to put that on reserve in the library; but again, I think that the edition that you have is reasonably up to date and so that's all that I'm expecting you to read. The other author, Franco Modigliani--in the book, the second author--was my teacher at MIT. He died in 2003. He is also a Nobel Prize winner and I think has a remarkable intellect. So this book, Fabozzi, et al.--Fabozzi, Modigliani, Jones and Ferri--is a very solid book about financial markets.

The second book that I'm assigning is Jeremy Siegel, *Stocks for the Long Run*. This is an old friend of mine. I met him in graduate school. Funny story, I met him because at MIT they signed us all up for chest x-rays alphabetically--that's the way MIT does things, an orderly way. Shiller and Siegel are next to each other in the alphabet, so I was standing in line with him for an x-ray and was talking with him and I've known him ever since. A funny coincidence is that since our names are close in the alphabet--you often find our books right together in bookstores because Shiller and Siegel--if they're shelving alphabetically--would end up together. He wrote a book called *Stocks for the Long Run*, starting in 1993. It just came out with the fourth edition and that book was a best seller. I think it sold over a half million copies. I'm not sure where it is now but it has done very well. It's been a perennial classic. It emphasizes the long run performance of the stock market, but it's really a general treatise of financial markets. I get a very good reaction from students about this book. This one is very readable. It's not as intense as Fabozzi, et al. Jeremy Siegel holds the unique distinction--*Business Week* did a poll asking MBA's about their favorite professor. This was about ten years ago. They ranked business school professors according to their popularity. He came out number one in the United States as business school professor. I think you'll like this book.

The next book is my own and called *Irrational Exuberance*. This is the last book--That's a phrase that was coined by Allen Greenspan in 1996 and it refers to the stock market boom of the 2000s--of the 1990s and the boom and the bust--well I think it's related to the bust that came out later, after 2000. I wrote this book in 2000 right at the peak of--fortunately right at the peak of the stock market. But what I'm assigning to you is the

second edition, which came out in 2005, pretty much at the peak of the housing market. We're going to talk about both the housing market and the stock market in these different books.

These books are all on sale at Labyrinth Books, which is an independent bookstore here in New Haven. I put it there because, well, I think the major chain bookstores fulfill an important function but I also like to support independent bookstores. I don't know if you know the story, but Labyrinth Books is independent, it's not a chain, and independent bookstores are trying--struggling--to survive. This is finance. In the book business, there's something difficult about maintaining an independent operation. Labyrinth was at Columbia University and Yale. For some reason they shut down their Columbia bookstore, but they've opened up now in Princeton. There was this famous bookstore in Princeton on Nassau Street called Micawber's, which is a wonderful bookstore. I've been in there a number of times. But they just went out of business. Labyrinth has moved in to take their place. Anyway, that's where all the books are and they are available now.

We're going to have these lectures on Mondays and Wednesdays. We're going to have T.A. sections in the second part of the week. We're going to ask you to look at your schedule sometime before our next lecture and think about when you can come to a teaching assistant section. They will be Wednesday, Thursday, and Friday and we have six problem sets. The six problem sets are due generally on Mondays and we'll go over the problem sets in the teaching sections, several days after you turn them in. This is one of the biggest classes at Yale, but I think we've got it so it will be a good and satisfying experience for you. We have very qualified--I'm very impressed with our teaching assistants. The important thing is for you to stay with them and get to know them and I urge you to attend the T.A. sections. The course is going to be graded. We have two mid-terms and one final. The in class mid-terms--the grades will be roughly 10% problem sets, 20% first mid-term, 30% second mid-term, 40% final. But we will also use judgment and I'm going to appeal to the T.A.'s to help me on judging the grading. Also, I ask the teaching assistants to give me little capsule descriptions of you so that if in ten years, or 20 years from now, I get a call from a reporter asking about this illustrious person who was once my student, I can have something to prod my memory. That's why I hope you'll stay with--you'll each find a teaching assistant and will stay with that person.

I want to say something about a particular interest of mine because it is part of this course, although not the entire course. Behavioral finance refers to a revolution in finance that has occurred over the last ten or 20 years and that is incorporated-- Behavioral finance is the theory of finance mixed in with the theories of other social sciences, notably psychology, sociology, political science, and anthropology. I think it's the most important revolution in finance of the last couple decades. Maybe I'm biased because I've been very much involved in it. I've been organizing workshops in behavioral finance at the National Bureau for Economic Research since 1991 with Dick Thaler at the University of Chicago. We think that we're avant-garde of a major revolution. The unity of the social sciences is, I think, very important. It's a mistake to try to consider finance in isolation. There is a whole array of other information related to finance. This will be

a theme of my course and also a theme of this book, *Irrational Exuberance*. That's what exuberance refers to--it's a psychological term. So that's an important element of this course.

Another thing that I will be talking about is less important to this course but you have heard of this: the subprime crisis. This is the big financial event that is hitting the United States and the entire world right now. I'm actually writing another book about this. It's not done in time for you to read but I think I will have it done at some time during this semester. What does it mean? "Subprime" refers to the mortgages that were made mostly over the last ten years or so to subprime borrowers. A "subprime borrower" is somebody who has a poor credit history or some other indication that would suggest that they might not be able to repay the mortgage--they might default. The industry, subprime lending, has grown dramatically over the last ten years and, as you probably know, it's in big trouble now. What's happening is the housing market is dropping, home prices are falling, people are defaulting in record numbers, and there are foreclosures. What happens if you don't pay your mortgage? If you buy a house and you don't pay the mortgage, the contract says you lose the house--you're out--you've got to pay or it goes back to the mortgage originator. This crisis is very interesting to me because it's had so many ramifications throughout the financial world. It's exposing defects in many of our biggest financial institutions and every day we see more news about failures, huge losses, resignations, or firings of top finance people. So it's a very interesting time in finance. These things happen from time to time, but they happen with enough regularity that there's something we really want to understand as a systematic phenomenon. So that's another thing that I will be talking about.

Let me make another point about technology. Finance, I believe, is a technology and that means it is a way of doing things. It has a lot of detail. A financial instrument is like an engineering device. Here I'm tying to the engineering--Is anyone here from engineering? A couple of you, well this could be--In fact, some engineering schools offer courses in finance, did you know that? Engineers find it congenial because they have a way of thinking constructively about the world that is kind of parallel to finance. We have theories--mathematical theories--that lead us to devise financial structures, which are complicated devices just like engines or nuclear reactors. They have a lot of components and they have to work right. When people first devise some new financial instrument it typically has trouble. Like when they devised the first engines or the first nuclear reactors, it didn't work so well at first and then from the experience of many people working on it, over many years, a body of knowledge emerges and that's what we call technology. So technology is a powerful force in our society and I respect power of this kind. That's why I like to follow it up. But technology is also dangerous. Nuclear power, for example, may be our salvation when we run out of oil--or virtually run out of oil--it seems to be coming up over the next several decades--we're going to have to do that, we're going to need nuclear power. But it's also dangerous, as you know.

The same thing is true about finance. I think that, in a sense, the subprime crisis that we have is an example of the dangers of new technology. We have been seeing financial technology advance in recent years and this advancement of technology has brought

us some problems. Some people want to go back, some people think there's a lot of anger about the subprime prices and there's some anger expressed against the financial community. I think that we should be very careful not to let that deflect us from the recognition that this is important technology and that it's not the technology that's at fault; we have to get it right and then it will be powerful.

I've had some experience giving talks in less developed countries. I'm not a development economist. Now a development economist--that's Santosh's field--Development economics is a very important field in economics that is helping less developed countries emerge. I'm very proud to say that Yale has a strong department at the Growth Center on development economics. I'm not a development economist. Nonetheless, when I've spoken in less developed countries, I find that they're really interested in finance. I think that's because there's a growing recognition that that's what you need to know and that the countries that are emerging successfully are those that have well developed financial institutions that are adopting the technology. They have to adapt it to their own situation, but in many ways they're copying technology. There's nothing bad about copying technology, that's what everybody does. When somebody invented the automobile, before you knew it everyone was driving automobiles and they all looked pretty much the same. When someone invented the airplane, before you knew it every country had an airplane because there was a best practice, there was a best technology and it was not unique to any one country. So that's why I view this course as fundamentally about technology.

I want to say something about morality and about mixed feelings that people have about finance. I know that undergraduates--I don't know how you feel about finance. Some people have a reaction--If you say you're taking a course in finance, they think that maybe you're selling out or maybe you value money too much and that you should really be in some other field. This is a longstanding conflict in our thinking. There is some contempt for finance, I believe, because it makes so much money for many people. Many of our students go into finance. Yale is very strong in providing people to the financial community and, I have to say, they do very well. My first advice is if you want to make money, which I don't particularly advise, but if you do it's not a bad idea to go into finance. Just as, you know, you can make a lot of money with organic chemistry too. I think that what you have to do as a young person is develop your human capital and that means knowing how to do things.

But there is hostility toward finance that I think is very fundamental to a lot of our thinking. I wanted to say something about that. Part of it is that some people in finance get so rich. If you look at the list of the richest people, they're all connected to finance, right? I mean they understand it. Maybe they're not--Maybe they're in publishing or some other field but they understand finance and a lot of them are directly in finance. So what do we make of that? Well part of it is that we get very--We get a sort of jealousy of these people because why should someone have billions of dollars? Did they really deserve that? Some people who make a lot of money get self-important--who make a lot of money--and they end up not making a lot of friends in the process.



The Yale University Press is publishing a new book by Steve Fraser about Wall Street. He gives examples in this book about hostility toward--it goes way back--In Fraser's book he gives an example of--I've never heard of this person before, but William Durr, who was a financier in colonial America in the 1700s, made a lot of money and helped finance the Revolutionary War in the United States. He ended up being chased down the street by an angry mob. People hated him and why was that? Well it was partly because he got so rich and he started wanting to show off. He had what they called "livery servants," not just servants, but servants who were wearing livery, like a military uniform. It looked like aristocracy coming back in the form of rich financial successes and we don't like that. There is a feeling of hostility toward that. There has been a long discussion about what people owe each other and how okay it is to try to make money.

I don't know if you remember--I have to start erasing here--one of the most well known Yale professors of the nineteenth century was William Graham Sumner, who wrote a famous piece called, *What Social Classes Owe to Each Other*. Sumner graduated from Yale in 1863. He was a member of Skull and Bones--have you heard of that? You know that group? He spent his entire career at Yale and he wrote--He was Head of our social sciences department, before we had separate departments of economics and psychology, etc. He was a very prominent exponent of the idea that people should go out for their own interest. One social class does not owe anything to another and we should not feel guilty about pursuing financial interests. That led to an attitude among a good segment of our society that it's okay to go out and make money because making money means doing productive things for the economy and ultimately it's a benefit to society. But we have some discomfort with that.

Another book, which I haven't put on reserve yet but I'm going to, is by Peter Unger, who is a philosopher. It's a remarkable book called *Living High and Letting Die* that refers to a more broad philosophical issue that we have. It is that most of us are really making money for ourselves--that's what we do with our lives--and whether or not that is moral. It's not just rich people who do that--the rest of us do it also--and in Peter Unger's book he--On the first page, he has an address and it's an address for UNICEF, which is the United Nations Children's Fund, and he starts out his book with that address where you could send money right away. I thought it was very impressive that he put that on page one of the book because it puts the reader in a moral dilemma.

He points out that it's estimated that for every \$3 you send to UNICEF, you can save a life. That's because there are people in this world who are not getting medical care. There are people who are dying of diseases for which there are known cures because they don't have the best medicine, which are often not even expensive but they're living in such poverty. So he says, why don't you stop right now and send \$100 to UNICEF. It was very impactful to start a book that way because I doubt that hardly any readers actually write out a check on the spot to UNICEF; but if you don't, then you are in some sense responsible for the loss of 30 lives. It's quite striking and it helps you to reflect on what makes us behave the way we do. By the way, when you go back to your computer, Google UNICEF, and you can give \$100 to UNICEF within the hour. Maybe I could ask for a show of hands of how many people did that. I expect that not many of

you will and I don't think that proves that you are bad people--this is a very interesting philosophical question--but what it means is that there is a moral dilemma underlying all of our economic lives and I think this moral dilemma is the same as the moral dilemma in finance. It's just that people in finance are sometimes very successful and they could give a lot more than \$100 to UNICEF.

One thing that I wanted to emphasize in this course, or try to emphasize, is that part of finance is actually philanthropy. The most important--The most successful people in finance, I believe, end up giving the money away and that means--you can't consume a billion dollars. There's no way that you can do that. You can only drive one car at a time and if you have five cars--well I mean that's kind of--all right you could have five cars and you could drive a different one everyday, but it's starting to seem a little ridiculous, right? At any rate, you're not using them and they're going to end up being used by somebody else. So I think the outcome should be philanthropy and those of you who are successful really ought to give it away.

I'm bringing in outside speakers as part of this course and, among them, I'm going to bring in people who I think have been philanthropists. That's the mode of thinking that is most attractive when you think about financial markets. So let me tell you about--I have slots now for four outside speakers. I've lined up two of them and let me tell you about the two that I've already lined up. The first one is our own David Swensen. David Swensen came to Yale University in 1985 from Wall Street, although he was a Yale graduate. At that time the Yale endowment was actually slightly under one billion dollars. What is the endowment of Yale? The endowment is defined as the financial assets that Yale University owns. Yale also has an art collection, which is worth many billions, but we don't count that as part of the endowment because they will never sell it so it doesn't provide income for us.

Yale also has a physical plant, like this beautiful building that we're in, but that's not part of the endowment either. The financial assets that Yale had, at that time, were about one billion dollars. Since then, David Swensen has invested or has managed the investment of this endowment and it has done phenomenally well. Yale now has over twenty-two billion dollars in its endowment. The return he got from 1996 to 2006 was 17% a year on investments. Last year the return on the Yale portfolio was 28% in one year. Now I don't know how impressed you are, the year before that it was 22% in one year. Now some of this might be luck but I don't think it's all luck because he's done this consistently for so many years. If you look up around this campus now, you'll see a lot of construction, a lot of things are being spruced up and improved. I think David Swensen has had a big hand in doing that because we have the money that makes it possible. The endowment at Yale is something like two million dollars per student now that's just sitting there as money that could be spent.

How did he do this? That's one of the amazing things. It seems to have something to do, I think, with academic understanding. That being part of a university community is a good thing for investing and you can see some evidence in that. Harvard University, Princeton University, and other universities have done extremely well on their endowments;

however, not quite as well as Yale. Yale, I think, is the number one performer so it's very interesting that we're able--it's very significant that we're able to get David Swensen. He doesn't do a lot of public speaking but he is willing, for young people like you, to do this--so that's one of our outside speakers. He also has two books about investing that we'll talk about.

The second person I have set up now to come--although the date on the syllabus online is going to be changed--is Andrew Redleaf, who is also a Yale graduate and who set up a hedge fund called Whitebox Advisors. It has done phenomenally well in investing. I think--I have on the syllabus a New York Times article about him. He's a very original and creative thinker who looks at things from a unique perspective and I find it very interesting talking with him. To do well in investing you have to have your own independent view of things and really be thinking about how things work and he is someone who does that. Incidentally, the New York Times had another article about Redleaf, saying that he was really one of the first persons to clearly delineate the subprime crisis that we're now in. He saw it coming and, I have to say, profited from it. If you know the subprime crisis is coming, then there's always a way to profit from that and that's what he did. But he also has a philanthropic side so it all comes out very well.

I think in the remaining time I will just go through an outline of the course and that means go through the topics of the various lectures and then I'll let you go for today. So the way this course is divided up is different than the Financial Theory course. If you look at John Geanakoplos's course on Financial Theory, his mathematical concepts are central to his outline of the course; but this being a Financial Markets course, I'm dividing it up more in terms of markets and institutions. I still want to start with some theory and I thought that--well I will--I plan to start by talking about the most basic concepts of risk management, which underlie finance. That will be Wednesday's lecture. I call it the universal principle of risk management pooling and the hedging of risk. I think it's the most important theoretical concept that underlies finance and insurance, which we'll also talk about a little bit in this course.

The idea is that if you spread risks they don't disappear, they're still there, but they're spread out over many people and the impact on any one person is reduced. So a basic principle of insurance is that if each person or each family suffers the risk, for example, that a parent, father or mother, might die then it is a terrible blow to the family; but it's not a blow to society as a whole because people die and it has a certain statistical regularity. It makes sense that we pay families who have lost a father or a mother so that they can keep going. It benefits everyone to have a situation in place for that. I wanted to talk about that with a little bit of reference to probability theory and so that's what I will be covering. The next lecture will be among the more mathematical, although it's very elementary. If you had a course in probability and statistics, then you'll find it easy to follow, but it's self-contained again. I feel like I have to introduce concepts like variance and co-variance and correlation in order to talk about finance; so that's what we'll do in Lecture Two.

The following lecture--I want to come back to some basic themes that--the third lecture--

-about technology and it relates to another book that I wrote. I'm not assigning it, but I wrote a book called *New Financial Order* in 2003 about technology and finance. A theme of that book was that--I've already said this to you, but it's a very important point--financial technology is evolving and improving just the way engineering technology or biochemical technology is improving. It's getting better year by year and the course of finance over your lifetime will be dramatic, so the financial institutions that we have ten years from now will look very different from the ones we have now.

We have to understand--in understanding the progress of financial technology--is its fundamental relation to information technology. Computers, the Internet, and communication devices are fundamental to financial progress and they make things possible that wouldn't have been possible before. Oftentimes, inventions that seem, in the abstract, to be good ideas may be impossible because something that you have to do to make it actually come into practice is too expensive and so it's not economic to produce the invention. But then developments in other fields can change the relative prices and suddenly make an idea that had been hypothetical and unapplied suddenly work well. So financial inventions also involve experimentation. Like in any other invention, nobody knows what will work and abstract theory doesn't guide you completely. Once an invention is seen to work it is rapidly copied around the world. We can see various breaks in financial history when some new idea was suddenly proven workable. Traditionally, financial inventions were not granted patent rights, but now in the United States and in a number of other countries it has become possible to patent financial inventions. I know I've done that in my life and so I think it gives a different perspective on finance.

Then I want to talk about insurance. The institution of insurance is something that really came in--it's one of the earliest--I consider it a division of finance--really came in the 1600s when probability theory was invented. The mathematical theory of probability was unknown until that time and you can see that insurance suddenly made an appearance at that time. This will be an historical as well as a theoretical discussion of insurance.

Then I will move to portfolio diversification and supporting financial institutions. This is again a more theoretical lecture. It will be about the capital asset pricing model. It will be about the securities market line, about the beta, about the mutual fund theorem, and it will also be about institutions that we have--about investment companies and their management. So it's really parallel to an insurance discussion. Insurance pools risks like life risks or fire risks by writing policies to individual policyholders. Portfolio management pools risks in a different way: by assembling a diversified portfolio or a portfolio that's negatively correlated with a risk that someone has.

Then I want to go to the efficient markets theory. "Efficient markets" is a theory about--well it came in about three decades ago, maybe it's closer to four decades ago--it's a theory that financial markets work very well and incorporate information very well. The efficient markets hypothesis was encouraged--actually the idea goes back over 100 years--it's encouraged by the observation that financial markets seem to respond with great speed to new information and, when new information appears, prices will suddenly

adjust in the financial markets. Certain kinds of financial markets called "prediction markets," which may, for example, predict the outcome of an election have been seen to be very accurate predictors, often better than pollsters can manage. So there seems to be some deep wisdom of the market. I think that "efficient markets" is an important concept. On the other hand--and this is something that I want to emphasize--you don't want to carry that too far and one of the lessons of behavioral finance is that markets are not really efficient in a global sense. Human psychology drives markets a great deal. If markets were perfectly efficient, David Swensen could not have done what he did. It would not be possible to make excess returns in finance. I believe it's clear that it is and that people who do so are people who understand more than the core efficient markets theory. They understand something about human nature and how human nature interacts with our institutions.

The next lecture is about behavioral finance and I want to talk in that lecture about research and psychology, things that come out of another department here, the psychology department, which has traditionally been ignored in economics and finance but is coming back. I want to talk about Kahneman and Tversky's Prospect Theory, which is a very important and a little technical--psychologists can become mathematical and technical as well. It'll be an important part of our understanding of financial markets.

Then I want to talk in the next lecture about regulation, which means government oversight of financial markets and not just government oversight, there are also the so-called self-regulatory organizations that are created in the financial industry to self regulate. So, for example, FINRA, which used to be called The National Association for Security Dealers, is a membership organization of people in the financial community and it imposes rules on its members. It's not a government organization but it is a regulator. The problem is that not everyone is nice and not everyone is high-minded so financial markets--the success of financial markets is, in many ways, a success of regulation. Governments establish regulators who set down rules for participants in financial markets and these rules may be perceived as onerous and costly to people in the financial community, but ultimately it's their salvation and it's what makes everything possible.

After that, I want to talk about the debt markets. Debt is the simplest of financial instruments. It consists of a promise to pay, usually denominated in currency, and there are both long-term and short-term debt instruments. The shortest term debt instrument in the United States is the Federal Funds Rate, which is an overnight rate--one day maturity--and the longest issued by the Government is a thirty-year government bond, which will be repaid three decades in the future. There have also been one hundred-year bonds and there have also been perpetuities that--in the UK, for example, the British Consols--have no expiration date and they have infinite maturity. So the debt market is something worthy of studying because it really represents a market for time itself.

What is it that we're talking about when we talk about the rate of interest? It has units of time, it represents the price of time, and it is something that fluctuates through time in interesting patterns. They are very important drivers of our economy and our lives.

The theory of the term structure is the theory of how interest rates differ according to maturity or term. There are not only debt instruments that are payable in currency, but there are also indexed debt instruments that are indexed to the price level so that they give real interest rates. We've had episodes in our history when real interest rates have made major moves and these movements are very important for what is happening in our lives. Most recently--A few years ago, we were living in a regime of negative real interest rates, when the Fed was pursuing a very aggressive monetary policy. I suspect that with the subprime crisis the Fed will be pushing real interest rates down dramatically again and we may be in a period of negative real interest rates again.

After that I want to talk about the stock market and I want to--there's a lot to talk about. Of course, stocks are shares in companies and they're traded on stock exchanges and they're interesting to analyze because there's sort of an ambiguity about stocks that is not widely perceived by a lot of people. That is, share repurchase can change the units of measurement in a security and companies have to decide how leveraged the stock will be, which changes the stock price--leverage, meaning how much debt the company takes on. Moreover, companies have to decide how much dividends to pay on the stock. That's a decision of the management of the company and we have to understand how they make that decision and what that means to people who are valuing stocks. It's a very simple idea. The idea of dividing a company up into shares and selling them off, but in practice it involves a lot of complexities. We'll be talking about the Modigliani-Miller Theorem and related issues in this lecture as well as something about the behavior of the stock market and its tendency to go through dramatic movements. For example, like it has done recently if you've been following it earlier this year.

The next lecture will be about real estate and that brings us into the subprime crisis and connects with interests that are central to my own thinking. The housing market is a huge market. Right now the total value of single-family homes in the United States is about twenty trillion dollars and the market has been becoming increasingly speculative. Home prices have become unstable. Nationally, home prices in the United States rose 85% between 1997 and 2006 in real terms--in inflation-corrected terms. We've seen almost a doubling in the price of the average home in the United States. Why did that happen? Now they are falling and in real terms home prices have fallen almost 10% since the peak in 2006. This is not just a U.S. phenomenon; many countries around the world are experiencing home price booms and the beginnings of what might be a home price bust. I want to consider the market for homes and the market for mortgages, which are the instruments that finance homes. To what extent was the housing boom that we saw in recent years the result of revolution in financial technology? There have been many changes in our mortgage institutions that might be part of the reason for the boom in home prices. There's also a question of psychology.

The following lecture will be about banking, the supply of money and the money multiplier. It's also about: how banks operate; what their function is in our society; and, why they are such important institutions that have gone back for hundreds of years and remain powerful, central features in our economy. It's also about bank regulation, such as the Basel Accord, Basel I and Basel II. I also want to talk about the impact of

information and technology on banking.

The following lecture is about monetary policy. What do central banks do? In the United States, the central bank is called the Federal Reserve. In the United Kingdom, it's the Bank of England. In Japan, it's the Bank of Japan. And in Europe, it's the European Central Bank. All of these banks are really in control of short-term interest rates and these interest rates are used to try to manage and stabilize the economy. In response to the subprime crisis that we are now in, our central bank, the Federal Reserve, has been cutting interest rates aggressively to try to save the economy that appears to be declining. I want to try to understand in that lecture--help us to understand how this works and how we're getting solutions--possible solutions to these problems.

Then I want to talk about investment banking. An investment bank is a different kind of bank. I was talking, up to this point, about commercial banks. An investment bank is not a bank that accepts deposits; it doesn't deal with the general public. Instead it deals with financial institutions and it gets involved in underwriting securities for financial institutions. It's a very important industry and it's also one in which many of our students have found jobs, so I think it's important for us to try to understand the history of investment banks, the role they have in our financial community, and how they're regulated.

Then I want to talk about money managers--professional money managers--people like David Swensen. This is a community of people in a different segment of the financial industry. These are people who manage portfolios. We want to think about what kinds of forces operate on them and what kind of--I'm interested in viewing them partly as people who are experts in a certain kind of technology who live in a very competitive environment and try to understand why some of them succeed much more than others. It also relates to behavioral finance. That is, ultimately they are human beings like anyone else and some of their differences in success or failure may have to do with their own interconnections and their own psychology and interpersonal psychology.

Then I want to talk about brokerages. Those are institutions that arrange for or manage the buying and selling of financial assets, such as the New York Stock Exchange. Now the brokerage industry--The New York Stock Exchange goes back into the eighteenth century, it's very old. In fact, the idea of the stock exchange goes back to the fourteenth century, when in Flanders the first stock exchange called The Bourse was established. So it goes back many hundreds of years but it's in rapid change now because of information technology. It's one of the most rapidly changing, hard to keep up with areas because someone can set up an electronic exchange overnight and suddenly become a base for trading trillions of dollars of securities. It fits in well with the theme of this course about technology because in understanding what's happening with brokerages, our technology, the new information technology, is central.

Then I want to move to futures markets and forward markets. A forward contract is a contract made between two parties for execution in the future. Generally these are called over-the-counter contracts because they're not arranged through exchanges. We also

have standardized contracts that are traded on exchanges and they're called futures contracts. The futures contracts were invented in Japan in the 1600s at Osaka and they were developed for the rice market in Japan. They were uniquely Japanese until pretty much the nineteenth century and then they were copied all over the world and are now very important. I'm going to talk about one futures market that I have been instrumental in developing. I've been working with the Chicago Mercantile Exchange to create a futures market for single-family homes, which is sort of my connection to the futures industry.

Of course, there are many futures markets that we'll talk about. They're very interesting to me and I wonder why the business community isn't more aware of them. A futures market has a prediction going out years into the future of what every financial variable will be doing, so you can see the future in a sense through the futures prices. It's not always correct to think of it that way--we have to get into the theory of futures markets. In many cases that is not the right way to think about futures prices, but there are very important futures markets that--In the next lecture I want to talk about the various kinds of futures markets that matter. We have a stock index futures market and notably we have an oil futures market. The oil futures market is very significant because it represents the price of energy on dates into the future. We can now see the price of oil going out years into the future. We've just hit \$100 barrel price of oil, but what does that mean? Does that mean we're going to live in a world with \$100 oil? Well not if you look at the futures market, which is in backwardation now and it's predicting major drops in the price of oil.

Then I want to talk about options markets--this is getting close to the end of the course. An option is the right to buy something. Typically, we think of it as a stock option. An option is a contract that says you can buy so many shares of a company. The options have been traded for several decades, starting with the Chicago Board Options Exchange. But now there are many options exchanges. We have prices of options that change minute by minute. Now what do these changes and these prices mean? The options are a very useful technology for managing risks and I think that we'll see a rapid--Over the next few decades, we'll see rapid expansion in the scope of options contracts traded on the exchanges.

Finally, for the last lecture for this semester, I want to pull this together and talk about one of the themes that is summarized in terms of a theme of this course: the democratization of finance. Finance used to be a very esoteric field that only a few people in London and Paris and other world centers understood--Amsterdam and other places where financial technology emerged--but it's becoming democratized. With each year that goes by the concepts of finance are being applied more broadly and involving more and more people. With electronic technology, it's becoming more economical to offer sophisticated financial services to everyone. This is something that we're seeing. I think the subprime crisis that is the current financial crisis highlights this very well. What does subprime mean? Well I think it stands for the general population. The subprime mortgage market was bringing people into the mortgage market who in prior decades would not have been involved--would not have had any mortgage. The problem,



of course, with the democratization of finance is that if you raise the participation in financial markets, then you bring in people who are: less and less knowledgeable; less and less understanding of concepts of finance; and less capable and more vulnerable to exploitation. So the democratization of finance is, I think, the ultimate mission of--I find central to this course but it brings with it dangerous hazards and we have to think very carefully about how we do it.

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